WE CLAIM:

1. A method for the real-time measurement of aqueous cyanide, comprising:

providing a cyanide laden water test specimen in a flow cell, said flow cell adapted to contain a gold-plated piezoelectric crystal having a surface in fluid communication with said test specimen;

providing a controller to control the oscillation frequency of piezoelectric crystal;

determining the cyanide concentration within said test specimen by measuring a change in said crystal oscillation frequency caused by a chemical reaction between free cyanide and the gold-plated piezoelectric crystal.

2. The method of claim 1 further comprising providing at least one known standard cyanide concentration for calibrating the piezoelectric oscillation frequency to the known standard concentration of cyanide.

3. The method of claim 1 further comprising preconditioning said test specimen to remove impurities by filtering said cyanide laden test specimen.

4. The method of claim 1 wherein a portion of said piezoelectric crystal surface is coated with fluorinated spray coating to prolong operation lifetime of said crystal.

5. The method of claim 1 further comprising collecting the test specimen to recover gold after said cyanide concentration of said test specimen has been determined.

6. The method of claim 1 further comprising purging and rinsing said flow cell after said cyanide concentration has been determined.

7. The method of claim 1 further comprising agitating said test specimen within said flow cell to promote continued mixing within said test specimen.

8. The method of claim 7 wherein the agitating is by ultrasonic vibration.

9. The method of claim 7 wherein the agitating is by a micro-stirrer.

10. The method of claim 1 further comprising displaying and recording in real-time said measured cyanide concentration.

11. A method for the continuous, real-time measurement of aqueous cyanide, comprising:

providing a cyanide laden water test specimen in a flow cell;

providing a flow cell stack comprising a plurality of flow cells, each flow cell adapted to contain a gold-plated piezoelectric crystal having opposite first and second surfaces, said first surface being in contact with the test specimen and said second surface being exposed to an ambient atmosphere;

controlling the frequency of vibration of each piezoelectric crystal;

measuring changes in the frequency of vibration of the piezoelectric crystal, said changes resulting from a change of mass of said crystal caused by the reaction of the gold on the crystal with cyanide in the test specimen.

12. The method of claim 11 further comprising at least one known standard cyanide concentration for calibrating the piezoelectric oscillation frequency to the known standard concentration of cyanide.

13. The method of claim 11 further comprising preconditioning said test specimen to remove impurities by filtering said cyanide laden test specimen.

14. The method of claim 11 wherein a portion of said piezoelectric crystal surface is coated with fluorinated spray coating to prolong operation lifetime of said crystal.

15. The method of claim 11 further comprising collecting the test specimens to recover gold after said cyanide concentrations of said test specimens have been determined.

16. The method of claim 11 further comprising purging and rinsing said flow cells after said cyanide concentration has been determined.

17. The method of claim 11 further comprising agitating said test specimen within said flow cell to promote continued mixing within said test specimen.

18. The method of claim 17 wherein the agitating is by ultrasonic vibration.

19. The method of claim 17 wherein the agitating is by a micro-stirrer.

20. The method of claim 10 further comprising displaying and recording in real-time said measured cyanide concentration.

21. A continuous, real time cyanide concentration measurement system, comprising;

at least one flow cell adapted to contain a gold-plated piezoelectric crystal, said crystal having first and second surfaces, said first surface configured to contact a test specimen within the at least one flow cell and said second surface configured to contact an ambient atmosphere;

a controller to control and measure changes in oscillation frequency of said crystal caused by a chemical reaction between free cyanide within the test specimen and the gold-plated piezoelectric crystal.

22. The system of claim 21 further comprising at least one known standard cyanide concentration for calibrating the piezoelectric oscillation frequency to the known concentration of cyanide.

23. The system of claim 21 further comprising a filter to precondition the test specimen to remove impurities prior to the test specimen being contained in said flow cell.

24. The system of claim 23 wherein said filter is a semi-permeable membrane.

25. The system of claim 21 further comprising means for adjusting pH of said test specimen to a pH between 10 and 12.

26. The system of claim 21 wherein a portion of said first surface of said piezoelectric crystal is coated with a fluorinated spray coating to prolong operation lifetime of said crystal.

27. The system of claim 21 further comprising collection means for collecting test specimens to recover gold.

28. The system of claim 21 further comprising means for purging and rinsing said flow cell.

29. The system of claim 21 further comprising agitation means for promoting mixing within said test specimen.

30. The system of claim 21 further comprising real-time display and recording means of displaying and recording said measured cyanide concentration

31. The system of claim 21 further comprising dual piezoelectric oscillator circuits to allow simultaneous measurement of said changes in oscillation frequency of multiple piezoelectric crystals.

32. The system of claim 21 further comprising means for directing said test specimens to specific flow cells within a flow cell stack.